

In

Page 1 of 1

From: Lionel Lemay <LLemay@nrmca.org>
To: wtc@nist.gov
Cc: dlowe@nist.gov
Subject: WTC Draft Final Report Comment Form for Report: NCSTAR 1

Information Submitted on: 8/4/2005.

Name : Lionel Lemay
Affiliation : National Ready Mixed Concrete Association
Email Address : LLemay@nrmca.org
Phone : 847 918 7101
Report Number : NCSTAR 1
Page Number : Page 221
Paragraph : Table 9.1

Comment : Hardened egress routes are appropriate for ☐Selected Other Buildings☐
as well as buildings over 20 stories in height. Recommendation 24 retaining an
effective uninterrupted operation of a command and control center should also
be applicable to ☐Selected Other Buildings.☐

Comment Reason :

Revision Suggestion :

2005 WTC Report Comment Application 1.0, dlowe@nist.gov, rev. 6/21/2005

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Phone : 847 918 7101
Report Number : NCSTAR 1
Page Number : Page 214
Paragraph : Section 9.2.6 Group 6
Comment : Improved and hardened egress and access routes should be included in this recommendation and Recommendation 18. Hardened passageways will help assure that routes to hardened elevators are not obstructed by debris, and if properly designed and ventilated may serve as safe havens until assistance arrives.
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Report Number : NCSTAR 1
Page Number : Page 207
Paragraph : Section 9.2.3 Group 3
Comment : Re-occupying structures after burnout is desirable and achievable, as was demonstrated by buildings surrounding the WTC site, especially 90 West Street, and more recently the LaSalle Bank Building in Chicago where the fire was confined to several floors. In the latter case there were no sprinklers. Concrete provided adequate fire protection and compartmentation, no deaths occurred and the damaged areas of the building are being retrofitted for future use.
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Report Number : NCSTAR 1
Page Number : Page 202
Paragraph : Section 9.2.1 Group 1
Comment : NIST should modify its discussion to encourage design that considers the benefits of other building components in increasing the fire endurance and structural integrity of individual components or structural systems. A properly designed fire separation partition may perform as an element to resist deflections and/or transfer loads to other structural elements when the failure conditions of a particular structural component are reached.
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Page Number : Page 200
Paragraph : Section 9.2

Comment : This section is lacking any discussion regarding the potential impact of a building or building system collapse on adjacent buildings.

Recommendations may be needed for developing a method to determine if impact on or from other buildings warrants consideration in a building design and what if any provisions might be incorporated into model building codes and standards. The collapse of WTC 1 and 2 had a significant impact on WTC 3, 4, 5, 6, and 7 and several other surrounding buildings. If all the buildings surrounding the twin towers were of similar construction as WTC 7 and not of more robust construction like 90 West Street, there might have been more building collapses as a result of the collapse of the twin towers and additional collapses from the collapse of neighboring buildings.

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Phone : 847 918 7101
Report Number : NCSTAR 1
Page Number : Page 200
Paragraph : Section 9.2
Comment : Improved building evacuation will benefit from more robust egress routes including corridors, stairways, and elevator shafts.
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Page Number : Page 200
Paragraph : Section 9.2
Comment : Discussion of □structural frame□ is limited to girders, beams, trusses and spandrels. This excludes some concrete components. Composite structures of concrete and steel should be addressed for all buildings, especially those 20 stories or more in height. Concrete shear walls intended to serve primarily as fire protection or for compartmentation may limit deformations of, reduce temperatures of, and transfer loads from girders, beams, trusses, spandrels, and columns which are subjected to excessive loads. It may be more practical to transfer loads through elements primarily intended for fire safety than to incorporate other redundancies into the structural design of the building.
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Page Number : Page 74
Paragraph : Section 5.7
Comment : This section should emphasize that the weakened steel floor trusses resulted in excessive sagging in the floor system. Since trusses were quite deep, the thin 4" concrete floor remained in compression and likely prevented the trusses from complete collapse. Without such clarification, it may be interpreted by readers that structural concrete floor members failed.
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Page Number : Page 68
Paragraph : Section 5.6

Comment : The title of this section should be revised. The discussions are limited to the fire protection of steel columns which do not address other passive fire protection. This may lead to unintended misinterpretations that passive fire protection in general may be inadequate. To be consistent with the terminology of ASCE 29, it is suggested that ☐Passive Fire Protection☐ be replaced with ☐Fire Protection of Structural Steel☐. Discussion in this section might also include statements that SFRM was selected for this project in lieu of other fire protection methods such as encasing structural steel in concrete or masonry. Substantiation for such discussion may have been discovered if the scope of the report on the performance of buildings impacted by the events of September 11, 2001 included the buildings that did not collapse, such as 90 West Street.

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Page Number : Page 53
Paragraph : Section 5.2.2

Comment : This section provides a comparison of three building codes in place elsewhere in the United States at the time the twin towers were designed and erected. However, the comparisons appear to be limited to structural design loads. The fire protection provisions of these codes also differed. For example the 1967 Municipal Code of Chicago would have classified this structure as an E occupancy and would have required Type I-A construction due to the building's unlimited floor area and height. The use of Type 1-B construction would have limited the building to 12 stories. In this 1967 code for Type 1-A construction, all columns, interior and exterior, except those supporting the roof, required a 4-hr rating. Similarly, beams and girders, except those supporting the roof, required a 3-hour rating.

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Report Number : NCSTAR 1
Page Number : Page xlix
Paragraph : Table E-1
Comment : Several Buildings surrounding the WTC towers experienced burnout and did not collapse. The robustness of building elements and the ability of building elements to assist in transferring loads and limiting deflections appear to have played a significant role in allowing such buildings as 90 West Street to be reoccupied.
For example, comprehensive designs of buildings with steel exterior structural elements and concrete cores are not addressed. In addition, the report does not provide adequate recommendations for providing built-in redundancies by combining active and passive fire protection. Also, when fire resistance requirements were first developed for building construction, the majority of the fire protection was provided by robust concrete and masonry elements that provided additional benefits to the structure including increased robustness and structural integrity. These benefits appear to have been jeopardized with recent trends in design which focused on developing the least expensive and lightest weight systems to satisfy the fire endurance requirements of the standard fire test, ASTM E 119. A robustness component for all passive fire protection, including sprayed-on fire resistive materials (SFRM), may be needed.

Comment Reason :

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